Patient Blood Management : What Else?

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What Else?

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Patient Blood Management is an evidence-based concept aiming at preemptively reducing the need for red blood cell (RBC) transfusions to improve patient safety and outcome. Patient Blood Management is based on 3 pillars: preoperative treatment of anemia and iron deficiency, reduction of perioperative blood loss, and optimization of anemia tolerance including the utilization of restrictive transfusion triggers. Safety and efficacy of patient blood management has been shown in a variety of studies including 2 studies with more than 100,000 patients each.[1,2]

Althoff et al[3] in this issue of the journal present an impressive meta-analysis on studies that assessed the impact of the implementation of at least 1 patient blood management measure in each of the 3 pillars on outcome. The results are staggering (Table 1).

Given this impressive safety and efficacy, the question arises why patient blood management has not yet been introduced in all hospitals worldwide as a standard. A number of physicians may be overwhelmed by the large number (>100) of patient blood management measures that have been described.[4] In an initial phase of the introduction of patient blood management, I advise focusing on the following 7 measures:

1. Preoperative anemia treatment
2. Blood sparing surgical techniques with meticulous hemostasis
3. Use of cell salvage
4. Use of tranexamic acid
5. Advanced individualized and goal-directed coagulation management including monitoring and use of coagulation factor concentrates
6. Postoperative anemia treatment with i.v. iron
7. Restrictive transfusion triggers.

Even the introduction of these 7 key measures may seem difficult to a number of physicians. Therefore, the European Union and the National Blood Authority of Australia have issued implementation guides.[5,6] These guides provide some help. They, however, need to be adapted to the local situation in each hospital. In some hospitals a patient blood management program may be initiated by the board of directors with specific resources allocated. In most hospitals, patient blood management programs, however, started small and developed consecutively over years. In the latter context, the leader of the patient blood management program needs to be defined first; in many hospitals, this is a particularly enthusiastic anesthesiologist. The

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TABLE 1. Benefits of Patient Blood Management

	Change	*P*	Number of Patients
Transfusion rate	−39%	<0.00001	207,006
RBC unit per patient	−0.43 unit	<0.00001	216,657
Hospital LOS	−0.45 day	<0.00001	219,850
Major complications	−20%	<0.00001	214,298
Acute renal failure	−26%	<0.00001	166,955
Infection rate	−9%	<0.03	192,987
Thromboembolic events	−25%	<0.00001	170,189
Mortality	−11%	<0.02	221,528

LOS indicates length of stay.

second step is to choose the best-suited surgical discipline, which at many places is orthopedic surgery due long scheduling times allowing easy preoperative anemia treatment.[7,8] Then it is crucial to act data based. This means that data need to be collected systematically regarding preoperative anemia, perioperative blood loss, and transfusions and postoperative complications, length of hospital stay, and costs. This data collection needs to start long before the start of a patient blood management program to have a reliable baseline and continue thereafter. These data from within an individual hospital will convince implicated physicians and result in better program adherence. These data will convince other surgical disciplines and result in expansion of the program to these other surgical disciplines. Finally, these data will convince the Board of Directors and result in resource allocation for the patient blood management program.

Despite many aspects being clarified today, there are issues that need future research or particular attention. One is the question of whether preoperative iron deficiency without concomitant anemia requires treatment. Preoperative iron deficiency in cardiac surgery resulted in increased RBC transfusions and fatigue[9] and a trend toward a longer hospital length of stay.[10] There is, however, hardly any data in noncardiac surgery and this certainly requires future research.

The use of tranexamic acid has been shown to be safe and to reduce RBC transfusions in most all surgical disciplines.[11] The prophylactic use of tranexamic acid thus can be recommended in most patients undergoing major surgery.

Advanced individualized and goal-directed coagulation management including monitoring and use of coagulation factor concentrates has been shown to reduce significantly transfusions and mortality in a variety of surgical settings from trauma treatment[12] to cardiac surgery.[13]

The preoperative administration of i.v. iron to treat iron deficiency anemia is well known and increasingly used. The postoperative use of i.v. iron, however, is much less common despite the fact that there are several prospective randomized studies documenting safety and efficacy.[14,15] Clearly, this area deserves greater clinical attention.

The future potential of patient blood management is extremely high. Patients, treated at centers that have not yet implemented patient blood management will benefit in all domains listed in Table 1. In centers that have only implemented some measures, patients will benefit more with the introduction of additional measures. Patients, treated at centers that have introduced multiple measures already may benefit from a more consistent application of these measures. Finally yet importantly, patient blood management has traditionally been implemented in surgery. Patient blood management principles can, however, also be used in most of the internal medicine specialties including oncology.[16]

As with each program, costs are an issue. Many are concerned about additional costs of a patient blood management program. All big programs, however, consistently report major cost savings, in Germany,[1] in Australia,[2] in the United States,[17] and in Switzerland.[18] These reported cost savings are blood product acquisition cost. They, however, represent just about a third of the true, that is, activity-based costs, which are relevant for hospitals.[19] The focus on blood product acquisition cost thus significantly underestimates the cost savings. In addition, the savings due to avoided complications and mortality need to be considered as well. It may be difficult to calculate the exact treatment cost of each complication. Nevertheless, from a patient and economics point of view it is certainly worthwhile avoiding any complication and mortality.[20]

Now that safety and efficacy of patient blood management has systematically been confirmed by this meta-analysis, the stage is set for worldwide implementation. Conversely, not implementing patient blood management represents substandard care.

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